REMARKS

Claim 18 was rejected under 35 U.S.C. 112. Claims 2, 4 to 8, 12, 15, 16, 23 and 24 were rejected under 35 U.S.C. §102(b) as being anticipated by Ohta. Claims 6, 8, 12, 13 and 14 were rejected under 35 U.S.C. 103.

Claims 9 to 11, 18 to 22, 25 and 26 were indicated as allowed or allowable.

Claim 18 has been amended. Claims 27 to 29 have been added.

Withdrawal of the rejections to the pending claims is respectfully requested, and reconsideration of the application as amended is respectfully requested.

35 U.S.C. 112 Rejections

Claim 18 has been amended to make clear that the displacing steps occur with a translation component perpendicular to the line of the image points by a first specific amount (e.g, circumferentially in the Fig. 2 embodiment) and in a direction defined by the line of the *n* image points by a second specific amount (e.g. axially in the Fig, 2 embodiment). See [0029] for example.

Withdrawal of the rejection is respectfully requested.

35 U.S.C. 102 Rejections

Claims 2, 4 to 8, 12, 15, 16, 23 and 24 were rejected under 35 U.S.C. §102(b) as being anticipated by Ohta.

Ohta discloses a laser beam light source used in a digital copying machine, laser beam printer or the like. (See Ohta at col. 1, lines 7 to 15).

Claim 2 is directed to a device for imaging printing plates, and claim 23 recites a print unit having a device for imaging a printing plate.

Ohta does not show such a device. A copying machine or printer does not image a printing plate, which is by definition a plate used in a printing press. See attached pages 24 to 29

of the Handbook of Print Media, for a general background on printing plates in a printing press.

Withdrawal of the rejection under 35 U.S.C. 102 is respectfully requested.

Moreover, it is respectfully submitted that it would not have been obvious to modify Ohta for imaging such a printing plate, as such devices are completely different from copiers and printers and the like, and the use of the polygon scanner of Ohta and other elements of the copier appear to teach away from such a use in a computer-to-plate system for imaging a printing plate.

Withdrawal of the prior art rejections to claims 2 and 23, and their dependent claims, is respectfully requested.

New claims 27 to 29 recite other features not shown in Ohta. Support for the new claims is found for example in [0002], [0025] and [0029].

Conclusion

It is respectfully submitted that the present application is now in condition for allowance, and Applicants respectfully requests such action.

Respectfully submitted,

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HEIDELBERG

Helmut Kipphan (Ed.)

Handbook of Print Media

Technologies and Production Methods

Including 1275 figures, mostly in color
and 92 tables

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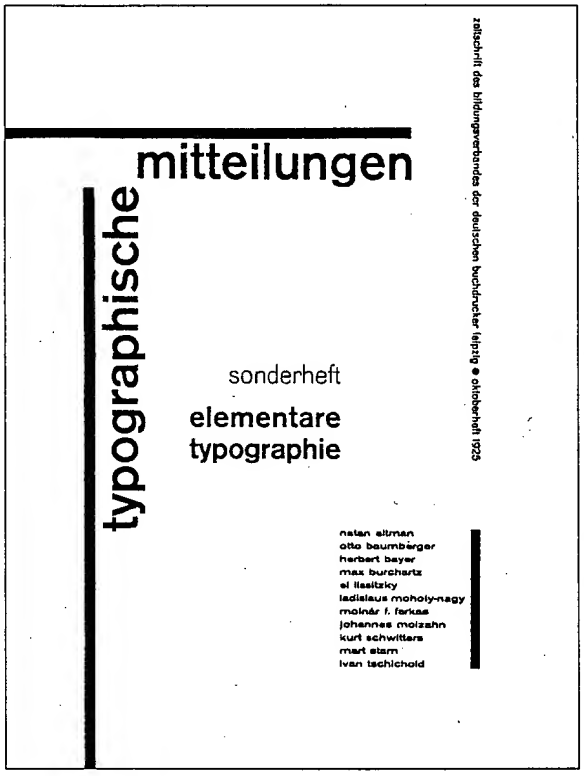


Fig. 1.2-20
Magazine cover in elemental design (Jan Tschichold 1925)

Fig. 1.2-21
Concert poster in the style of "Swiss typography" (Josef Müller-Brockmann 1960)

1945, exemplary achievements from the USA transformed this European development into the varied and differentiated field which characterizes graphic design in the world today (fig. 1.2-22).

1.2.2 Prepress

Prepress includes all the steps which are carried out before the actual printing, the transferring of information onto paper or another substrate (fig. 1.2-23). Traditional prepress is divided into three areas:

- *composition*, that is, recording text, formatting text, and pagination;
- *reproduction* of pictures and graphics, and particularly color separations for multicolor printing;
- *assembly and platemaking*, i. e., the assembly of text, picture, and graphic elements into complete pages, (page layout/make-up), from pages to print sheets,

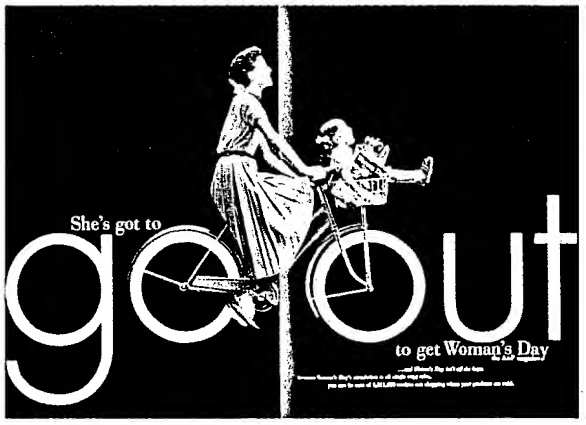


Fig. 1.2-22
Advertisement for a magazine in contextual text-picture combination (Gene Federico 1953)

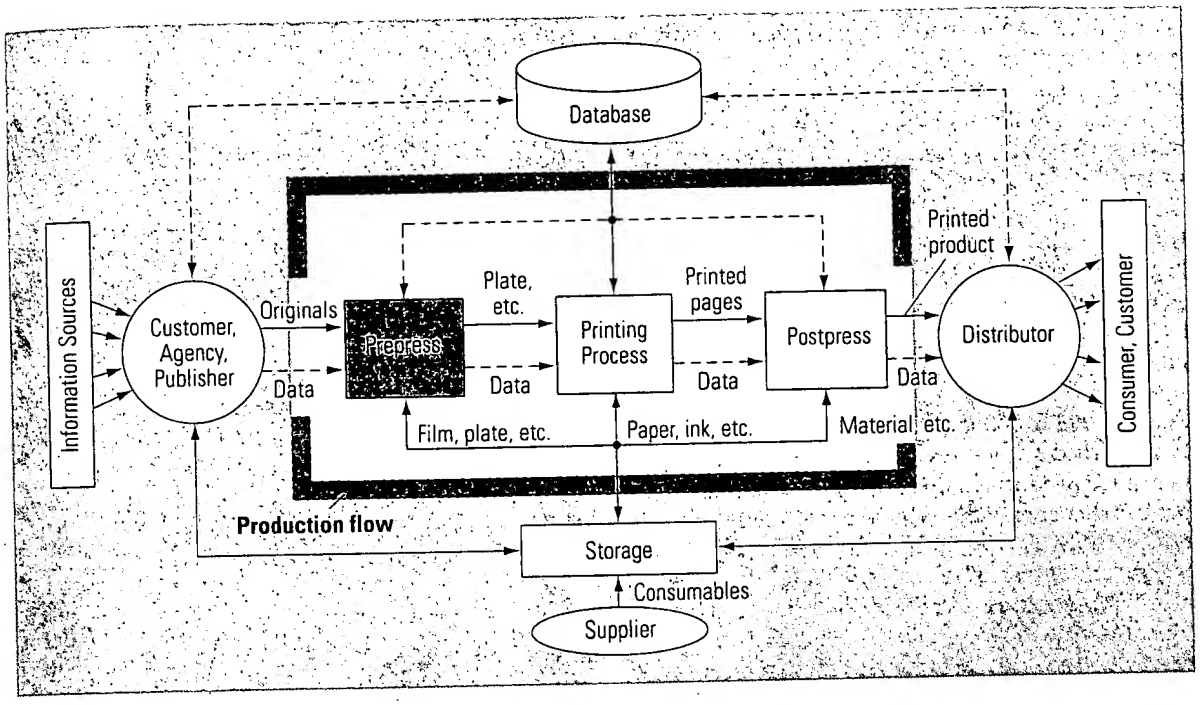


Fig. 1.2-23 Prepress in the production flow for the generation of printed products

and also the making of the printing plate as the vehicle of information in the printing press (fig.1.2-24).

Chapter 3 gives a detailed description of both so-called conventional prepress (sec. 3.1) and digital prepress (sec. 3.2).

Composition Technology

For centuries *composition technology* was dominated by the pioneering invention of Gutenberg – the letterpress with movable type. This process remained practically unchanged from the fifteenth until the end of the nineteenth century. Letters molded from lead were assembled into words, lines, and blocks of text (manual typesetting). Composition only became mechanized towards the end of the nineteenth century in the wake of industrialization. In 1885 Ottmar Mergenthaler developed a line casting machine, which became known by its trade name "Linotype." It made it possible to compose whole lines of matrices by means of a keyboard and to fill them with molten lead. This machine dominated composition until the 1960s – along with "Monotype", which operated in a similar way but produced individual letters, and the still indispensable manual typesetting.

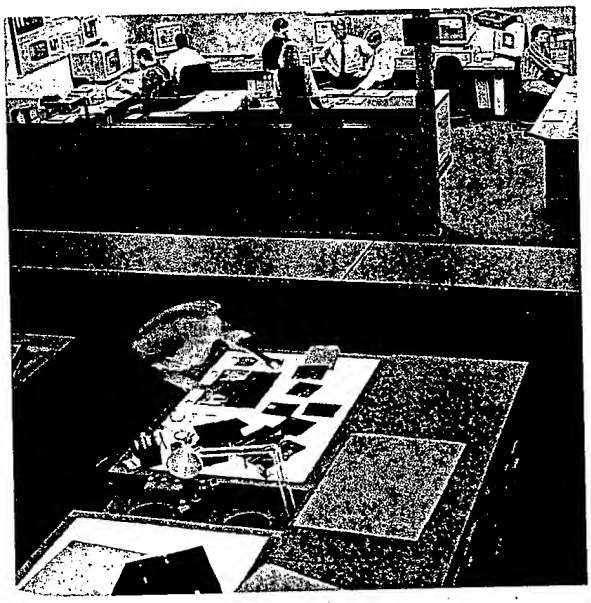


Fig. 1.2-24
Prepress with conventional film stripping and digital master preparation (text, images, graphics) with EDP systems

As quicker and more effective printing technologies began to replace letterpress, particularly offset and gravure printing, the traditional lead composition was improved by innovations. *Photocomposition* began to be developed in the 1940s – at first, as an analog process, in which text was exposed letter by letter onto film through matrices. The breakthrough for photocomposition, and with it the decline of lead composition, first came at the beginning of the 1970s with *digital photocomposition systems*. This involved the transfer onto film of lines of text entered via a keyboard into the processor of a computer by means of cathode ray tubes and later by laser.

Pictures and Graphics

In the early days pictures and graphics were integrated in printed products in the form of woodcuts, and copper and steel engravings. *Reproduction technology* in the modern sense did not come in until the end of the nineteenth century as photographic procedures made it possible to capture pictures on film and to screen them, that is, to break them up into small dots. (*Screening* is necessary because with conventional printing technologies it is only possible to produce solid tints and not continuous tones. The continuous tone effect is simulated for the human eye by printing a number of tiny halftone dots of varying sizes next to one another.) An extra step with multicolor printing is the *separation of colors*, that is, the breaking down of color photos into the process colors used for the print (usually cyan, magenta, yellow, and black).

In *letterpress printing* the screened and separated film served first as an original for etching a relief in a metal surface (plate or printing block) from which prints were made. In *offset printing* the films can be used directly for platemaking. To check color reproduction quality before printing, a test print or proof can be made. This proof is produced photomechanically from the color separation films and simulates the result of the printing process.

In the 1970s the *scanner* emerged, which is used to optoelectronically scan, separate in colors, and screen originals and either directly record them on film by laser or first store them as digital data for further processing in a image processing system. Figure 1.2-25 shows a scanner for producing color separations, such as the ones for a four-color print shown in figure 1.2-26.

Platemaking

The task of platemaking is to assemble text, pictures, and graphics into pages and pages into sheets. Since the printing formats of most printing presses are essentially larger than the page format of the printed product, several pages are almost always printed on one sheet. The next step is to produce the plate for the particular printing technology.

Fig. 1.2-25 Drum scanner for image capture (Tango, Heidelberg)

The image carriers used for letterpress printing were traditionally made by combining blocks of text (consisting of individual letters or lines that were prepared in typesetting) and the blocks from reproduction to produce large metal forms. The platemaking for letterpress printing "flexography" is discussed in detail in section 2.3.3.

For offset printing the process films (text, graphics, and pictures) in accordance with the page arrangement are first mounted onto a film in the size of the printing format (offset assembly). The assembly then serves, at the subsequent stage for the purposes of photographic image transmission onto an offset plate in a contact method (offset platemaking). At the next stage the plate

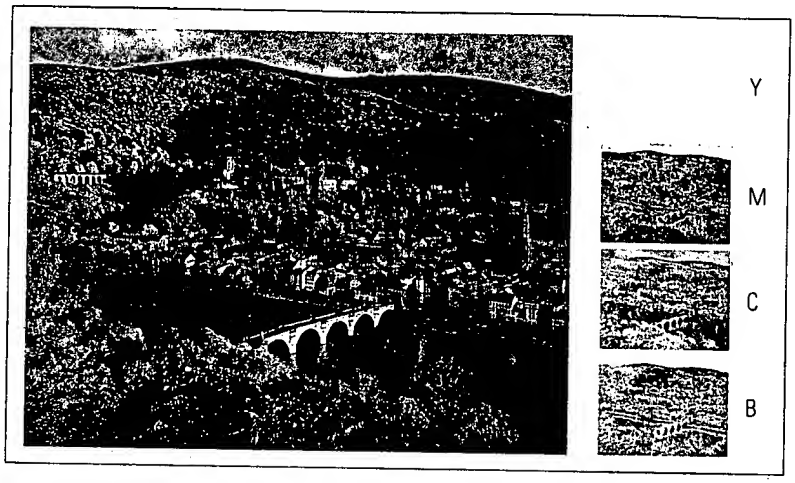


Fig. 1.2-26
Color separations for four-color printing (Heidelberg)

serves as the image carrier for the offset press. In every printing technology a plate must be produced for each color to be printed.

Figure 1.2-24 shows how conventional methods (film assembly) as well as computer systems are used for artwork preparation (text, image, graphics) in prepress. Figure 1.2-27 shows how film assembly is set in the copying frame for platemaking in conventional copying process. Both films or plates can also be exposed using digital systems directly based on digital data, as is explained later.

For gravure printing, so-called Helioklischographs have been in use since the 1970s to make printing plates. Here, the films are mounted on the copy drum and the signals produced by an optoelectronic scanning head are transmitted to control an engraving stylus. This simultaneously engraves the image onto a copper cylinder which serves as the image carrier for gravure printing.

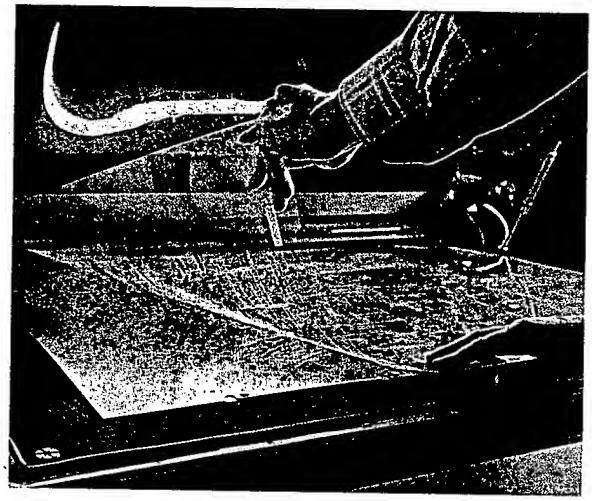


Fig. 1.2-27
Positioning of the film assembly in the copying frame for platemaking (Heidelberg)

Digital Prepress

Through innovations aimed at achieving digital prepress, an evolutionary change has taken place since the end of the 1980s in prepress which has almost entirely eliminated the classical division into the three areas of composition, reproduction, and platemaking.

During the 1980s, desktop publishing (DTP) became a serious alternative in prepress. This came as a result of the development of personal computers (PC) with full graphic capacity (e.g., Apple Macintosh), workstations, professional layout, graphic, and image processing software, the page description language PostScript, and high-resolution laser imagesetters with raster image processors (RIP).

Desktop publishing means that the capture and editing of text, the capture of pictures (scanning) and their editing, and designing of graphic elements, as well as the completing of pages (layout) can be carried out at one computer station. Used together with an output unit (imagesetter) the PC can also carry out color separations and screening of the finished pages, so that the whole page is exposed on a film (full-page film).

Obviously there are also programs for the digital sheet assembly which take over imposition and the positioning of printing aids (register marks, cutting

marks, etc.). With the help of a large-format imagesetter, films can also be produced in the format of the printing press. *computer to film technology* is the state of the art.

At the beginning of the '90s DTP took over the prepress almost overnight and has now almost completely replaced the specialized composition and image editing systems as well as photomechanical reproduction. Since around 1995 (even earlier for gravure printing), *computer to plate technology* (CtP) has played an increasingly important role. CtP means that the printing plate is imaged directly and the intermediate step of imaging a film is abandoned. In gravure, the cylinder is directly engraved using digital information. A further step in the production flow is therefore eliminated and ultimately all the prepress steps are carried out from a single computer workstation. There are already offset printing presses that use integrated exposure units to expose the plates in the press (direct imaging). Since no film is used in CtP, a previous proof must be made digitally, usually in the form of a proof print on a special dye sublimation, ink jet, or thermal printer.

Figure 1.2-28 shows how a full-page film is made in digital prepress with a computer to film unit and laser imaging of the film. Figure 1.2-29 shows how the printing plate is produced directly from the database of the digitally described printing sheet.

These technological changes in prepress have also brought about fundamental changes in the types of job offered in prepress. The tasks of the three classical occupations of compositor, reproduction technician, and platemaker can today be carried out at one work place by a single skilled worker. This was taken into account in Germany in 1998, when a new course training candidates to become "media designers" (see sec. 13.1.2) was created. After successful training the media designer is proficient in all prepress processes. Consequently, it is considered by many to be the most demanding occupation in the graphics industry.

Thanks to DTP practically any author or graphic artist who has access to a PC and the appropriate software can perform at least some of the steps involved in prepress. Although this has opened up many opportunities to individuals, it has, unfortunately, also resulted in an increasing flow of poor-quality printed products flooding the market. The creation of printed products by computer requires not only mastery of the program used and the necessary typography and design know-how, but above all an accurate understanding of the subsequent printing and finishing processes. It is usually only trained experts who are endowed with this expertise.

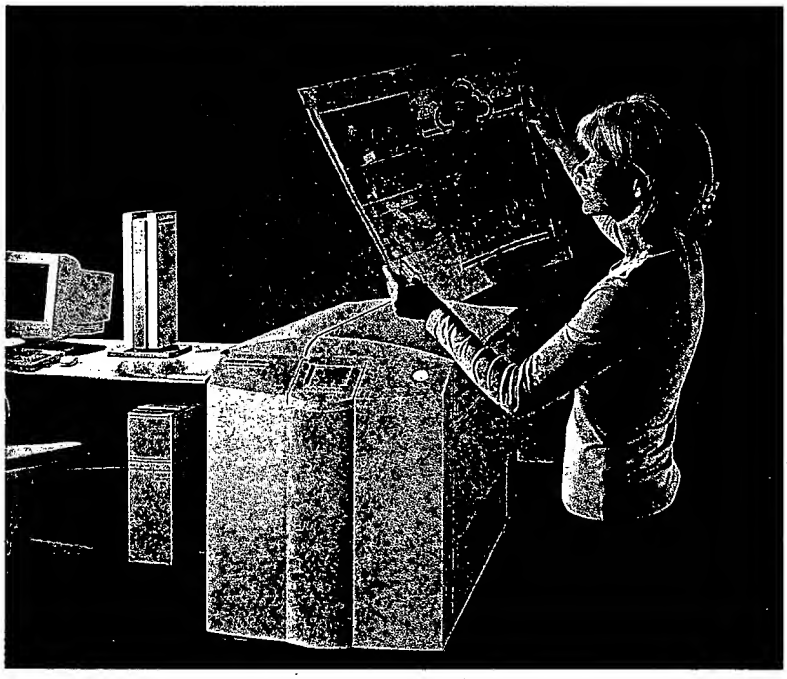


Fig. 1.2-28
Full-page film output on a computer to film system (Herkules, Heidelberg)

The diagrams in figure 1.2-30 show the process of evolution in prepress from the individual steps of composition, reproduction, and assembly to an integrated process for platemaking.

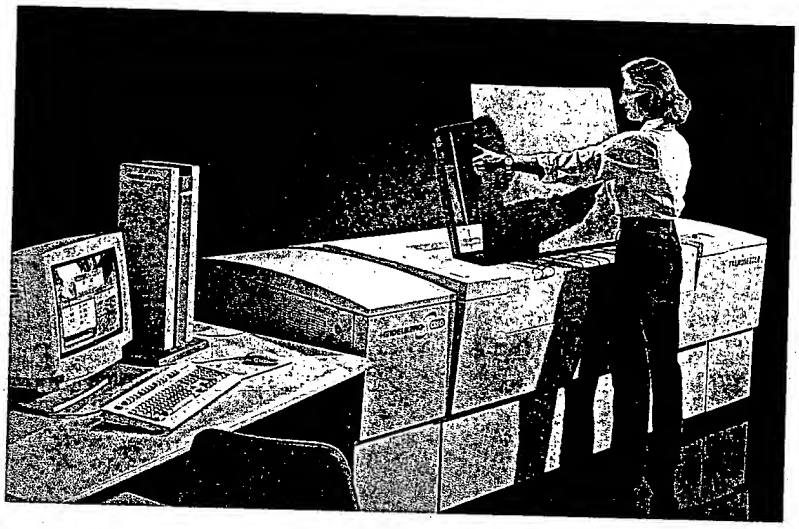
1.2.3 Printing

Printing is described as the process of transferring ink onto paper (or another substrate) via a printing plate (fig. 1.2-31). In the course of the centuries many different printing technologies have been developed and these can be divided into four main technologies according to the type of image carrier used as shown in figure 1.2-32.

In section 1.3 (and in particular in chaps. 2 and 5) the different printing technologies are dealt with in detail. In section 1.6 printing presses and systems are described in detail. First, a short overview.

Letterpress (Relief) Printing. Here, the printing elements (letters, lines, dots, etc.) are raised. When the printing plate is inked, the ink adheres to the raised (printing) parts and is then transferred under pressure onto the printing substrate. The main examples of this printing technology are *letterpress* which, until a few decades ago, was the dominant printing technology and *flexography* which, by the middle of this century, had started to be used more and more in packaging printing. With traditional letterpress

Fig. 1.2-29
Computer to plate system for digital imaging printing plates (Trendsetter, Heidelberg/Creo)



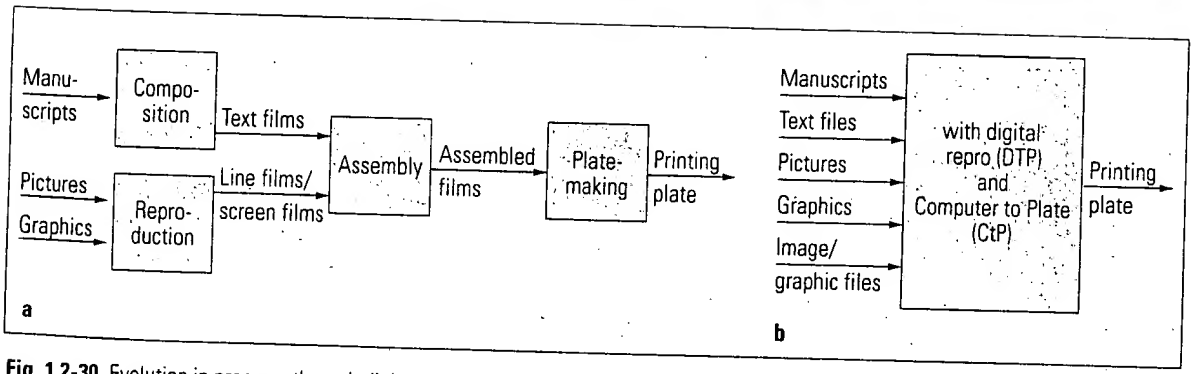


Fig. 1.2-30 Evolution in prepress through digitalization of the processing sections.
a Conventional prepress (around 1980);
b Digital prepress (around 1997)